ASSIGNMENT 2

Textbook Assignment: "Generators," chapter 3.

2-1. The National Electrical Code NEC® requires emergency generators and standby generator systems to be kept entirely separate of all other wiring and equipment.

1. True
2. False

2-2. When designing an emergency generator backup system, which of the following must comply with electrical safety standards and codes?

1. Design
2. Material
3. Installation
4. All of the above

2-3. When emergency power replaces normal power, which of the following load requirements is powered?

1. Full load
2. Maximum capacity of the generator
3. Selected loads
4. 50% of normal power

2-4. A well-operated active base should have a minimum of which of the following (a) annual load factors and (b) power factors?

1. (a) 25% (b) 95%
2. (a) 45% (b) 90%
3. (a) 50% (b) 80%
4. (a) 50% (b) 75%

2-5. Lighting circuits will be powered by 240 or 208 volt systems.

1. True
2. False

2-6. When calculating a generator's electrical load, which of the following factors must be determined first?

1. Generator size
2. Amount of ampere fluctuation in the system
3. Connected load
4. Both 2 and 3 above

2-7. The electrical power group maximum demand determines the size of which of the following pieces of equipment?

1. Generator
2. Conductors
3. Electrical apparatus
4. All of the above

2-8. Which of the following terms is/are known as the ratio between the actual maximum demand and the connected load?

1. Group maximum demand
2. Required supply demand
3. Demand factor
4. All of the above

2-9. The demand factor is usually less than 1.00 for which of the following reasons?

1. All load devices are seldom in use at the same time
2. All load devices will seldom reach maximum demand at the same time
3. Some load devices are usually larger than the minimum size needed and draw less than their rated load
4. All of the above

2-10. The total connected load of your repair shop is 60 kW, while the maximum demand is 40 kW. What is the demand factor?

1. 26%
2. 50%
3. 66 %
4. 75 %

2-11. Because of noise levels, fire hazards, and air circulation, regulations prevent you from locating a generator closer than a minimum of how many feet to a load?

1. 25
2. 20
3. 15
4. 10

2-12. A generator supplying power for an advanced base should be located at the

1. barracks site
2. edge of the base
3. points of small demand
4. points of large demand

2-13. Assume you have the responsibility of providing shelter for advanced base generators. Before the shelter can be constructed, you must give the builder all EXCEPT which of the following information?

1. Electrical power load
2. Number of generators to be sheltered
3. Size of the generators
4. Arrangement of the exhaust system

2-14. One way to get rid of excess engine heat in and around a generator set that is installed inside a building is by

1. providing suitable exits for exhaust gases
2. opening all the doors and hatches on the generator set
3. providing large louvered openings in the side of the generator set
4. providing large louvered openings in the building walls at the front and back of the generator set

2-15. When installing a generator exhaust system you must make sure that there are no more than three right-angle bends and that the piping is level.

1. True
2. False

2-16. Which of the following minimum generator exhaust pipe insulation temperature ratings should you install?

1. 500°
2. 1000°
3. 1200°
4. 1500°

2-17. Which of the following minimum generator ground terminal conductor size should you use for your generator installation?

1. 4 AWG
2. 6 AWG
3. 8 AWG
4. 10 AWG

2-18. The generator change board facilitates conversion of which of the following voltages?

1. 120/208 only
2. 240/480 only
3. 120/208 or 240/480
4. 120/208 or 240/416

2-19. Positioning of the voltage charge board connects two coils of each phase in series or in parallel.

1. True
2. False

2-20. When grounding a generator with a solid metal rod, you must ensure that the ground rod complies with which of the following requirements?

1. Is embedded below the permanent moisture level
2. Has a minimum diameter of 5/8 inch
3. Is driven to a minimum depth of 8 feet
4. Both 2 and 3 above

2-2 1. When grounding a generator with a grounding plate, you must ensure that the ground plate complies with which of the following requirements?

1. Has a minimum of 2 square feet of surface area
2. Is buried at a minimum depth of 2 l/2 feet
3. Both 1 and 2 above
4. Is a minimum of 6 inches thick

2-22. The NEC® states that if you are using a single ground rod to ground a generator set, it must have what maximum resistance to ground?

1. 25 ohms
2. 30 ohms
3. 35 ohms
4. 40 ohms

2-23. When installing multiple rods or plate electrodes, they should be installed at what minimum distance apart to meet NEC® requirements?

1. 5 feet
2. 6 feet
3. 8 feet
4. 10 feet

2-24. When installing a generator, which of the following tests will determine the required number of ground rods?

1. Conductivity
2. Static saturability
3. Earth resistance
4. Either 2 or 3 above

2-25. Which of the following factors must be determined before the installation of a generator feeder cable?

1. The size of conductors
2. Whether conductors will be direct burial, overhead, or installed in conduit
3. Proper voltage output
4. All of the above

2-26. Concerning generator cable loading, voltage drop should NOT exceed which of the following percentages for combined power and lighting loads?

1. 6%
2. 2%
3. 3%
4. 5%

2-27. Feeder conductors are capable of carrying which of the following percentage of rated generator amperes?

1. 100%
2. 125%
3. 150%
4. 200%

2-28. In a traffic area, what is the minimum burial depth for a cable?

1. 18 inches
2. 24 inches
3. 36 inches
4. 48 inches

2-29. Electrical cable may be covered with backfill (earth) that is free of rocks.

1. True
2. False

2-30. Which of the following duties are performed by personnel on generator watch?

1. Operating generator equipment
2. Maintaining generator equipment
3. Keeping the generator operating log
4. All of the above

2-31. In which of the following logs should the number of generator operating hours be recorded?

1. Generator fuel log
2. Generating station log
3. Generator inspection log
4. Generator maintenance log

2-32. One purpose for keeping a generator station log is to help determine when a particular piece of equipment needs preventive maintenance.

1. True
2. False

2-33. Which of the following requirements applies to oily cleaning rags in and around the generator spaces?

1. They must be stored outside
2. They must be stored in a wooden box that has wooden chips to absorb any oil
3. They must be stored in an oily waste container that has a cover
4. Either 2 or 3 above

2-34. As a generating plant supervisor, you are responsible for which of the following actions?

1. Supervising the activities of the operating personnel
2. Maintaining a continuous and adequate flow of electrical power
3. Supplementing your knowledge of the electrical plans and diagrams with an actual study of the generating station's systems
4. All of the above

2-35. Connecting an electric plant to a de-energized bus involves which of the following actions?

1. Starting the diesel engine and bringing it up to rated speed
2. Operating the switchboard controls
3. Both 1 and 2 above
4. Aligning the compressed air system on all electric-start engines

2-36. Which of the following documents contains the procedure that assures that all systems and controls are properly aligned for operation?

1. Prestart checklist
2. Operator maintenance manual
3. Intermediate maintenance manual
4. Shutdown checklist

2-37. Which of the following devices/switches adjusts the generator frequency?

1. Voltage regulator
2. Governor control
3. Synchronizing switch
4 Frequency switch

2-38. Which of the following actions should you take if the load of a single generator becomes so large that its rating is exceeded?

1. Secure the feed to unnecessary loads
2. Install a generator near the greatest load demand
3. Add another generator in parallel
4. Implement electrical ration hours

2-39. Before two generators can be operated in parallel, they must be brought into synchronism. when they are in synchronism, which of the following conditions must exist?

1. The terminal voltages must be equal
2. The frequencies must be equal
3. The voltage sequences must be in phase
4. All of the above

2-40. Which of the following terms describes the operation of getting a generator into synchronism?

1. Synchronizing
2. Balancing
3. Paralleling
4. Equalizing

2-41. Which of the following factors is a primary consideration in paralleling generator sets?

1. Proper division of the load
2. Proper division of the speed
3. Proper regulation of the speed
4. Both 2 and 3 above

2-42. Isochronous and speed droop are the two types of governor operations you should be concerned with when paralleling generators.

1. True
2. False

2-43. The isochronous governor will maintain which of the following generator actions?

1. Load regulation
2. Generator capacity
3. Output frequency
4. Load division

2-44. The number setting on the speed droop knob of a hydraulic governor indicates the percentage of droop.

1. True
2. False

2-45. On a solid-state electronic governor, when, if ever, are speed droop adjustments necessary?

1. As the load increases
2. As the load decreases
3. Both 1 and 2 above
4. No adjustments are necessary

2-46. When paralleling four generators in the droop mode, how many generator sets would be in the isochronous position?

1. One
2. Two
3. Three
4. Four

2-47. Concerning generator paralleling, it is preferable to have the frequency of which of the following generators slightly higher than the other generators?

1. The largest generator
2. The master generator
3. Either 1 or 2 above
4. The slave generator

2-48. Which of the following actions should you take if the phase sequence indicating light lights 1-2-3 on the master generator and 3-2-1 on the slave generator?

1. Commence paralleling operations
2. Interchange two of the load cables
3. Speed up the master generator
4. Slow down the slave generator

2-49. When the synchronizing lights blink ON and OFF simultaneously, this action indicates which of the following generator conditions?

1. Out of phase
2. In phase
3. Speed is too fast
4. Speed is too slow

2-50. The frequency at which the synchronizing lights blink ON and OF together indicates which of the following circumstances?

1. The frequency of the master generator is out of sync
2. The frequency of the salve generator is out of sync
3. One generator is out of sync and one generator is in sync
4. The different frequency output between the two generators

2-51. Conceming generator paralleling operations using a synchroscope, you should adjust the frequency of the slave generator until the synchroscope pointer slowly rotates in (a) what direction and to (b) what position?

1. (a) Counterclockwise
   (b) through the zero position
2. (a) Clockwise
   (b) through the zero position
3. (a) Clockwise
   (b) through the six o'clock position
4. (a) Counterclockwise
   (b) through the six o'clock position

2-52. While paralleling using the synchronizing light, you should close the main circuit breaker during which of the following conditions?

1. When lamps are dark
2. When lamps are bright
3. When one lamp is bright and the other dark
4. Either 2 or 3 above

2-53. The master generator will absorb all load changes and maintain correct frequency unless it becomes overloaded or until its load is reduced to zero.

1. True
2. False

2-54. The power factor of an electrical load is determined by dividing the

1. true power by the peak power
2. true power by the apparent power
3. apparent power by the peak power
4. peak power by the average power

2-55. Capacitors may be used to improve the power factor of the system when the reduced power factor has been caused by effects of which of the following electrical factors?

1. Inductive reactance
2. Capacitive reactance
3. Pure resistance
4. All of the above

2-56. You can divide the reactive load between two generators by adjusting the

1. speed of the generators
2. voltage of the generators
3. speed droop of the generators
4. capacitance-reactance of the voltage regulators

2-57. Which of the following conditions may shut down the generator automatically and disconnect it from the main load?

1. Engine overspeed
2. High jacket water
3. Low lubricating oil pressure
4. All of the above

2-58. What is the purpose of installing both a mechanical clock and an electric clock at the power plant?

1. To ensure correct generator output frequency
2. To compensate for power failure
3. To ensure correct generator output voltage
4. To indicate improper division of reactive load

2-59. Which of the following is NOT a recommended time frame for the generator operator maintenance program?

1. Hourly
2. Daily
3. Weekly
4. Monthly

2-60. Of the following maintenance checks, which one is NOT performed by the operator?

1. Checking the level of the coolant
2. Greasing the fuel transfer pump
3. Draining water from the fuel tank
4. Adding oil to the crankcase

2-61. Which of the following is NOT a recommended time frame for the generator preventive maintenance program?

1. Weekly
2. Monthly
3. Quarterly
4. Semiannually